

## Description

# Sun Visor Arm with Notched Break Points

### BACKGROUND OF INVENTION

[0001] 1.Field of the Invention

[0002] The present invention generally relates to automotive sun visors which are rotatively and pivotally mounted above the windshield. More particularly, the present invention relates to pivot rods upon which sun visors are pivotally mounted, wherein the pivot rod has a connection interface which is rotatively connected to the roof of the vehicle. Still more particularly, the present invention relates to a head impact energy absorbing pivot rod having Notched break points.

[0003] 2.Description of the Related Art

[0004] Motor vehicle standards are being continuously updated. One area of current concern is occupant safety in the event of a crash. Occupants are typically violently moved

in relation to the vehicle due to the inertial forces involved in a crash. Most vulnerable is the head of the occupants. In order for vehicle manufacturers to meet new safety standards prevention of head injury by violent contact is required.

[0005] One area of the interior of the passenger compartment of a motor vehicle that is particularly dangerous in the event of a head impact is the sun visor and sun visor rod. An occupant whose head violently strikes the sun visor and/or sun visor pivot rod is likely to be injured because the energy of the impact will be delivered to a small surface area of the skull and/or the visor material may fracture exposing a rigid sharp edge to the occupant's head. Solutions to this type of head injury are therefore required.

[0006] For example, U.S. Patent Number 4,178,035 issued December 11, 1979 to Cziptschirsch teaches a plastic sun visor arm, pivot, and mount assembly to replace the traditional comparable metal parts and eliminate the need to use screws to mount the assembly to the vehicle.

[0007] U.S. Patent Number 4,598,943 issued July 8, 1986 to Scholz et al teaches a method of mounting a sun visor on swivel bearing mounted within a deformable tube which can absorb energy during a collision by deforming under

the force of an occupant's head hitting the sun visor.

[0008] U.S. Patent Number 5,653,496 issued August 5, 1997 to Mori et al teaches a sun visor arm mounting bracket having a deformable weakened area which under impact to the sun visor allows the sun visor arm to pass through the mounting bracket thereby absorbing the energy of the impact.

[0009] U.S. Patent Number 5,984,398 issued November 16, 1999 to Crotty, III teaches a sun visor with a deformable front or leading edge which will deform and absorb the energy of a collision when an occupant's head hits the leading edge of the sun visor.

[0010] U.S. Patent Number 6,494,521 issued December 17, 2002 to Hennessey and U.S. Patent Application Publication Number 2001/0005088 published June 28, 2001 to Hennessey teaches a cover member to cover the sun visor arm and elbow to prevent an occupant's head from hitting same during a collision.

[0011] U.S. Patent Application Publication Number 2001/0024048 published September 27, 2001 to Hobson et al teaches the use of a non-expanding adhesive to adhere two halves of a clam shell type sun visor together.

[0012] DISCLOSURE OF THE INVENTION

- [0013] The present invention provides advantages and alternatives over the prior art by providing a sun visor arm that provides for the absorbing of energy during an impact with the front edge of the sun visor and directing the sun visor out of the impact area such that the sun visor front edge does not break under impact.
- [0014] According to a further aspect of the present invention, there is provided a sun visor arm that prevents injury to a vehicle occupant from striking the front edge of a sun visor during a crash.
- [0015] According to yet another aspect of the present invention there is provided an economical and advantageous sun visor arm that allows for energy absorbing features to be introduced during the molding process of the sun visor arm.
- [0016] According to a yet further aspect of the present invention there is provided The present invention thus advantageously provides an economical means of providing occupant protection from head injury from a sun visor during a crash.

#### **BRIEF DESCRIPTION OF DRAWINGS**

- [0017] Figure 1 shows a top plan view of one embodiment of the visor arm of the present invention.

[0018] Figure 2 shows a front plan view of the embodiment of the visor arm of the present invention shown in Figure 1.

[0019] Figure 3 shows a shows a partial cross section plan view of the notches of a preferred embodiment of the visor arm of the present invention.

#### **DETAILED DESCRIPTION**

[0020] Reference will now be made to the drawings, wherein to the extent possible like reference numerals are utilized to designate like components throughout the various views. Referring to Figure 1, which presents a top view of one preferred embodiment of the present invention comprising a tubular visor arm 10 with a distal end section 1 having an elbow shape and further having a mounting flange 4 (Fig. 2) for mounting to a visor arm mounting bracket (not shown).

[0021] As further shown in Figure 1 tubular visor arm 10 also comprises a mid section 2 and a proximal or tip section 3. The tubular end section 1, mid section 2, and tip section 3 all are molded as a single unit around a tubular metal shaft 8. Mid section 2 having at least one first breakaway notch 5 and at least one second breakaway notch 6 located substantially about 180 degrees from said at least one first breakaway notch 5 such that impact with the sun

visor causes the tubular visor arm 10 to collapse and move toward the windshield or front of the vehicle and simultaneously downward. In a preferred embodiment shown in Figures 1 and 2 there are two first breakaway notches 5 and two second breakaway notches 6. Tip section 3 has at least one flat area 7 (Figure 2) thereon providing a means of holding the sun visor in an up or storage position.

[0022] Referring now to Figure 2, there is shown a front plan view of the tubular visor arm 10 of Figure 1. This front view gives a better view of the mounting flange 4 located substantially at the distal end of tubular visor arm 10 as well as the elbow in the distal end section 1 as well as the at least one flat area 7 on the tip section 3. The notches 5 are also shown in this view which presents the side of the tubular visor arm 10 facing the occupant or rear of the vehicle when the sun visor (not shown) is in a down or use position.

[0023] Turning now to Figure 3, there is shown a partial cross section plan top view of mid section 2 of the tubular visor of shown in Figures 1 and 2. Tubular sun visor arm body 2 is shown with metal tube 8 and the notched configuration of first breakaway notched 5 and second breakaway point

6. It is to be noted that in the presently preferred embodiment the breakaway notches 5 and 6 penetrate through the tubular wall of mid section 2 but that either or both notches 5 and 6 can also be configured such that they do not penetrate the tubular wall of mid section 2.

[0024] Suitable materials for the composition of the tubular sun visor arm 10 include, for example, plastic, acetal or nylon, the presently preferred material is nylon.

[0025] Suitable materials for the composition of the metal tubular core 8 include, for example, tubular steel, tubular aluminum and the like.

[0026] During a impact by the occupant's head with a sun visor assembly having the visor arm of the present invention the at least one breakaway notch 6 creates a predetermined weak point where the visor arm will break from the impact directing the sun visor to move forward and downward. The at least one breakaway notch 5 providing upon impact a broken section that is less likely to create an exposed cutting edge to the occupant's head.

[0027] Although the preferred embodiments of the present invention has been disclosed, various changes and modifications may be made without departing from the scope of the invention as set forth in the appended claims.